



U.S. Department
of Transportation

Federal Aviation
Administration

Advisory Circular

Subject: USE OF PYROTECHNIC VISUAL
DISTRESS SIGNALING DEVICES
IN AVIATION

Date: 2/10/00

Initiated by: AFS-820/AFS-630

AC No: 91-58A

Change:

1. **PURPOSE.** This advisory circular (AC) suggests standards and procedures for the acquisition, use, and storage of pyrotechnic visual distress signaling devices that are intended for use in aircraft emergencies.

2. **CANCELLATION.** AC 91-58, Use of Pyrotechnic Visual Distress Signaling Devices in Aviation, dated 5/27/82, is canceled.

3. **BACKGROUND.** The Federal Aviation Administration (FAA) recognizes that many pilots and operators of aircraft are utilizing some distress signaling devices that are inherently dangerous, as well as ineffective, when used in actual emergencies. Typical of the problem is the use of "railroad or highway flares," which produce an excessive amount of high temperature slag, usually burn the user when hand held, and are easily extinguished when used in open bodies of water. Further, the incendiary nature of these and other pyrotechnics presents problems for their safe and proper storage in the aircraft environment. This advisory circular is written to guide the pilot/operator in the proper use and identification of pyrotechnic signaling devices.

a. **The Safety of Life at Sea (SOLAS) convention**, which was ratified in 1936 by the United States, provides safety standards for maritime emergency survival equipment, fireproofing, fire prevention, and such. The SOLAS convention revises the safety standards every 4 years. The convention ensures that a variety of safe and effective pyrotechnic signaling devices are available to the aviation community.

b. **Title 14 of the Code of Federal Regulations (14 CFR)** parts 91, 121, 125, and 135 require the carriage of at least one pyrotechnic signaling device for each life raft for extended overwater flights.

4. **DEFINITION.** For the purpose of this advisory circular, reference to "U.S. Coast Guard approved," in accordance with Title 46 of the Code of Federal Regulations (46 CFR) part 160, implies the minimum standards suggested by the FAA for pyrotechnic visual distress signaling devices. Reliance on U.S. Coast Guard expertise in the area of pyrotechnic signal device performance criteria is predicated on their historical involvement with the entire spectrum of search and rescue techniques, which they have originated and successfully implemented.

5. TYPES OF VISUAL DISTRESS SIGNALS. There is a wide variety of signaling devices, and no single device is ideal under all conditions and for all purposes. The most popular signaling device for aviation use is the hand-held combination flare and smoke device. Pyrotechnics make excellent distress signals and are universally recognized as such. However, one of the drawbacks of these devices is they can be used only once. Consideration may be given to carrying several types. For example, an aerial flare can be seen over a long distance on a clear night, but for closer work, a hand-held flare may be more useful.

a. U.S. Coast Guard approved visual distress signaling devices are divided into two general categories:

(1) Daylight signaling devices.

(2) Night signaling devices.

b. The following table lists the current U.S. Coast Guard approved devices. The device must have the 46 CFR part 160 series number referenced to be considered U. S. Coast Guard approved. Devices that conform to SOLAS have a much higher performance level. In addition SOLAS devices carry an additional U.S. Coast Guard approval number in the 160.121 series for hand flares, and the 160.136 series for parachute flares.

Number Marked On Device	Device Description	Accepted For Use
160.021	Hand-held red flare distress signals.	Day & Night
160.022	Floating orange smoke distress signals. (5 min)	Day Only
160.024 160.028	Pistol-projected parachute red flare distress signals. (These signals require use in combination with a suitable approved launching device.)	Day & Night
160.036	Self-contained rocket-propelled parachute red flare distress signals.	Day & Night
160.037	Hand-held orange smoke distress signals.	Day Only
160.057	Floating orange smoke distress signals. (15 min)	Day Only
160.066	Red aerial pyrotechnic flare distress signals. (These devices may be either meteor or parachute type and may need an approved, suitable launching device.)	Day & Night

6. WHEN AND HOW TO USE. Visual distress signaling devices are part of your aircraft's safety equipment. Check to see they are on board before departure so they may serve their intended purpose to summon help should the need arise. Visual distress signals can only be effective when someone is in a position to see them. When employing pyrotechnic devices, do so only when you see or hear a boat or aircraft, or you are reasonably sure that someone is in the proximity to see your signal and take action. Good judgment is an essential part of the successful use of visual distress signals.

a. Red hand-held flares are most effective at night or in restricted visibility, such as fog or haze, but may be used any time. Hand-held pyrotechnic devices, such as flares and smoke signals, may expel ash and slag as they burn. Even though these particles cool quickly, they can cause painful burns or ignite materials that burn easily. The flare itself is very hot and can start a fire if it is dropped. Therefore, when using these devices, they should be held in such a way that hot slag cannot drip on a hand or arm, or flammable materials.

b. Hand-held and floating orange smoke signaling devices are good day signals, especially on clear days. Both signals are most effective with light or moderate wind. Higher wind tends to keep the smoke close to the water, which disperses it, making it hard to see.

c. Red parachute flares, either pistol launched or hand-held rocket propelled, are good distress signals for both day and night. These devices provide altitude, slow descent, and brilliant intensity. Their slow descent, however, makes them drift with the wind, which can lead a would-be rescuer away from the rescue site.

d. Pistol-launched or self-contained rocket-propelled red meteors can be used by day, but are most effective at night. Because of their rapid descent, they are less affected by wind than the slower descending signals. The burn time is also shorter and not as readily observed as the slower descending signals. Whenever a pistol or hand-held rocket-propelled distress signal is used, the wind must always be taken into account. When firing the device in light wind, the pistol should be held at approximately 60° above the horizon, and aimed downwind. As the wind increases, increase the aiming angle up to, but no more than, 85°. A pyrotechnic device should not be fired straight up in a calm wind condition; this is to prevent the possibility of the device falling back on the individual.

7. HANDLING AND STORAGE.

a. If young children are carried on board your aircraft, careful stowage of visual distress signals becomes especially important. Projected devices, such as pistol-launched and hand-held parachute flares and meteors, have many of the characteristics of a firearm and should be handled with the same caution.

b. Pyrotechnic devices should be stored in a cool, dry location and be readily accessible in case of an emergency. Care should be taken to prevent puncturing or damaging of the device's covering. It is recommended that pyrotechnic devices be stored in a watertight container and prominently marked "DISTRESS SIGNALS."

c. U.S. Coast Guard approved pyrotechnic devices carry a service life expiration date. Currently, this date may not exceed 42 months from the date of manufacture. The U. S. Coast Guard indicates that it is acceptable to keep recently expired signals as extra equipment, although they gradually lose their effectiveness with age.

8. INFORMATION. For additional information regarding pyrotechnic devices, consult the U. S. Coast Guard web page at www.uscg.mil/hq/g-m/mse4/vds.htm.



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